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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,056	01/21/2004	Gary S. Ash	0100.2045-000	3792
21005	7590	06/15/2006		
HAMILTON, BROOK, SMITH & REYNOLDS, P.C. 530 VIRGINIA ROAD P.O. BOX 9133 CONCORD, MA 01742-9133			EXAMINER EARLY, MICHAEL JACOBY	
			ART UNIT 3744	PAPER NUMBER

DATE MAILED: 06/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/763,056	Applicant(s) ASH ET AL.	
	Examiner Michael J. Early	Art Unit 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 January 2004 and 03 August 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/3/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

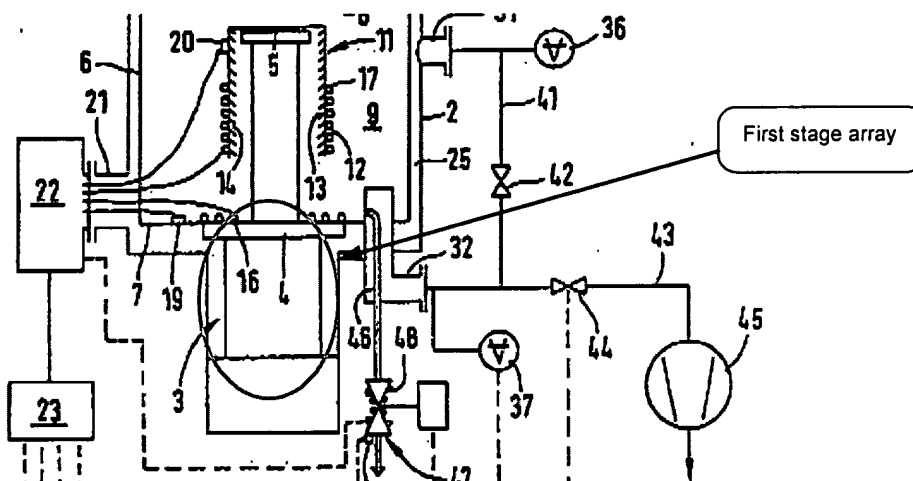
Claims 1, 3-6, 8-13, 15-19, 21-26, 28-31, 33-38, 40-44 and 46-49 are rejected under 35 U.S.C. 102(b) as being anticipated by Hafner et al. (U.S. 5,400,604).

Regarding claims 1, 3-6, 8-12 and 26-37; Hafner et al. disclose a methodology comprising:

- coupling/connecting (41 – conduit) a pressure gauge (36, 37 – pressure measuring device) in fluid communication with a vacuum region (9 – pump interior) behind a condensing surface (11 – cold surfaces of the second stage) of a cryopump (1 – cryopump) (as seen in Figure 1);
- measuring pressure with the pressure gauge (col. 6, lines 6-10);
- connecting the pressure gauge to a tube or duct (41 – conduit) leading to the vacuum region (as seen in Figure 1);
- adsorbing gases at the condensing surface, the adsorbed gases consisting substantially of low-boiling-point gases (see col. 1, lines 40-46; col. 5, lines 18-29);
- the low-boiling-point gases include at least one of hydrogen, helium or neon (see col. 1, lines 40-46; col. 5, lines 18-29);
- a process chamber (34 – recipient) coupled (33 – inlet valve) to the cryopump (as seen in Figure 1);
- elements (13 – inner surface regions) that are coated with an adsorbent (see col. 5, lines 25-29);

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- first (as seen in the partial illustration of Figure 1 below) and second stage arrays (13 – inner surface regions), the condensing surface is within the second stage array (see col. 5, lines 18-29; Figure 1);
- a partial pressure of hydrogen inside the second stage array is lower than a partial pressure of hydrogen outside the second stage array (intended use);
- determining a pumping capacity of the cryopump using the measured pressure (col. 6, lines 51-68; col. 7, lines 1-12);
- predicting a pumping capacity for low-boiling-point gases based on the measured pressure (col. 6, lines 51-68; col. 7, lines 1-12);
- determining an adsorption capacity of the cryopump using the measured pressure (col. 6, lines 51-68; col. 7, lines 1-12).



(Partial illustration of Figure 1)

With regards to those limitations that are functional recitations, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the *structural* limitations of the claimed.

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Regarding claims 6 and 31, Hafner et al. do not expressly disclose:

- the pressure differential between the vacuum region and process chamber.

At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to make the pressure within the vacuum region at least one order of magnitude less than that found within the process chamber because the Applicant has not disclosed that having the pressure within a vacuum chamber at least one order of magnitude less than that found within the process chamber provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, therefore, would have expected the Applicant's invention to perform equally well with either the implicit pressure differential taught by Hafner et al. or the claimed one order of magnitude differential because both pressure differentials are necessary in the operation of the cryopump.

Regarding claims 9 and 34, Hafner et al. do not expressly disclose:

- the partial pressure differential of hydrogen between the inside and outside of the second stage array.

At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to make the partial pressure of hydrogen within the second stage array less than that found outside of the second stage array because the Applicant has not disclosed that having the partial pressure of hydrogen within the second stage array less than that found outside of the second stage array provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, therefore, would have expected the Applicant's invention to perform equally well with either the implicit pressure differential taught by Hafner et al. or the claimed pressure differential because both pressure differentials are necessary in the operation of the cryopump.

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Regarding claims 13, 15-19, 21-25, 38, 40-44 and 46-49; Hafner et al. disclose an apparatus comprising:

- a closed cycle refrigerator (9 – refrigeration unit);
- a cooled condensing surface (11 – cold surfaces of the second stage);
- a pressure gauge (36, 37 – pressure measuring device) in fluid communication with a vacuum region (9 – pump interior) (as seen in Figure 1);
- the pressure gauge is connected to a tube or duct (41 – conduit) leading to the vacuum region (as seen in Figure 1);
- gases are adsorbed within the condensing surface, the adsorbed gases consisting substantially of low-boiling-point gases (see col. 1, lines 40-46);
- the low-boiling-point gases include at least one of hydrogen, helium or neon (see col. 1, lines 40-46);
- first (as seen in the partial illustration of Figure 1 above) and second stage array (13 – inner surface regions) cooled by the refrigerator, and the second, colder stage further including the condensing surface (see col. 5, lines 25-29; Figure 1);
- a second stage cryopanel (11 – cold surfaces of the second stage) surrounded by a radiation shield (6 – radiation shield), the cryopanel having elements (13 – inner surface regions) that are coated with an adsorbent (see col. 5, lines 25-29);
- a second stage cryopanel (11 – cold surfaces of the second stage) surrounded by a radiation shield (6 – radiation shield), the cryopanel having elements (13 – inner surface regions) coated with an adsorbent (14 – hatching), the elements being coupled to and in close thermal contact with a heat sink (22 – heat supply) on the second, colder stage (as seen in Figure 1; As recited by the Applicant, element 206b is referred to as a “heat sink” or “heat station” [see Specification, page 6, lines 10-13]. Therefore, using the broadest interpretation of the claim, the aforementioned “heat supply” is being interpreted as a location where heat is positioned or stationed.);
- a partial pressure of hydrogen inside the second, colder stage is less than a partial pressure of hydrogen outside the second, colder stage (intended use);

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- an electronic controller (23 – control device) which measures pressure with the pressure sensor (see col. 6, lines 63-67); the controller including computer instructions (inherent – for an electronic controller to operate, it must be preset or programmable to function in a certain manner) which
 - determine a pumping capacity based on the measured pressure (col. 6, lines 51-68; col. 7, lines 1-12);
 - predict a pumping capacity of the cryopump for low-boiling-point gases based on the measured pressure (col. 6, lines 51-68; col. 7, lines 1-12);
 - determine an adsorption capacity for the condensing surface using the measured pressure (col. 6, lines 51-68; col. 7, lines 1-12).

With regards to those limitations that are functional recitations, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the *structural* limitations of the claimed.

Regarding claims 18 and 43, Hafner et al. do not expressly disclose:

- the pressure differential between the vacuum region and process chamber.

At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to make the pressure within the vacuum region at least one order of magnitude less than that found within the process chamber because the Applicant has not disclosed that having the pressure within a vacuum chamber at least one order of magnitude less than that found within the process chamber provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, therefore, would have expected the Applicant's invention to perform equally well with either the implicit pressure differential taught by Hafner et al. or the claimed one order of magnitude differential because both pressure differentials are necessary in the operation of the cryopump.

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Regarding claims 21 and 46, Hafner et al. do not expressly disclose:

- the partial pressure differential of hydrogen between the inside and outside of the second stage array.

At the time the invention was made, it would have been an obvious matter of design choice to a person of ordinary skill in the art to make the partial pressure of hydrogen within the second stage array less than that found outside of the second stage array because the Applicant has not disclosed that having the partial pressure of hydrogen within the second stage array less than that found outside of the second stage array provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, therefore, would have expected the Applicant's invention to perform equally well with either the implicit pressure differential taught by Hafner et al. or the claimed pressure differential because both pressure differentials are necessary in the operation of the cryopump.

Regarding claims 25 and 49; Hafner et al. disclose an apparatus comprising:

- a means for connecting (41 – conduit) a pressure gauge 36, 37 – pressure measuring device) in fluid communication with a vacuum region enclosed by cryopumping surfaces (2 – housing) (as seen in Figure 1);
- a means for measuring pressure (23 – control device) with the pressure gauge (see col. 6, lines 63-67).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 2, 14, 27 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hafner et al. as applied to claims 1, 13, 26 and 38, respectively; and further in view of Pfeiffer et al. (U.S. 4,873,833).

However, Hafner et al. do not expressly disclose:

- an ion gauge.

Pfeiffer et al. teach of an apparatus that creates a high vacuum system through the use of a cryopump (see col. 1, lines 6-10). Further disclosed is that the pressure within the apparatus is measured by an ion gauge (42) (see col. 5, lines 27-33; Figure 3).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Hafner et al. by incorporating an

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ion gauge to measure the pressure within the apparatus, as taught by Pfeiffer et al., because they are simple, readily available devices that are known for their accurate measurements.

Claims 7, 20, 32 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hafner et al. as applied to claims 1, 13, 26 and 38, respectively; and further in view of Pfeiffer et al.

However, Hafner et al. do not expressly disclose:

- an array of baffles.

Pfeiffer et al. further disclose that the apparatus is comprised of a plurality of chevrons (12 – which correspond to the claimed baffles) that are supported by a multiplicity of support ribs (13) (see col. 4, lines 24-27; Figure 1). Further disclosed is that the apparatus is comprised of auxiliary cooling means, which are adapted for the removal of heat from the cryopump (see col. 3, lines 28-68).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the existing apparatus of Hafner et al. by incorporating a plurality of chevrons, as taught by Pfeiffer et al., so that a larger surface area within the apparatus will be available for absorbing molecules of gas.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Amundsen et al. (U.S. 6,895,766 B2) teach of an electronic controller that is incorporated within a cryopump.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Early whose telephone number is (571) 272-3681. The examiner can normally be reached on Monday - Friday, 7am - 4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJE
6/12/06

Michael J. Early
Patent Examiner
Art Unit 3744




CHERYL TYLER
SUPERVISORY PATENT EXAMINER